AMENDMENTS TO THE CLAIMS

Please amend the present application as follows:

Claims

1. (Canceled)

2. (Previously presented) An optical retimer for retiming an optical data signal, the optical retimer comprising:

an optical switch configured to allow light corresponding to a current bit to enter an optical pathway of the retimer at a specific point in time derived from the clock rate; wherein the optical switch has a first state in which, for a length of time corresponding to some fraction of a clock period, light corresponding to the current bit is allowed to propagate along the optical pathway and light corresponding to a next bit is dumped, and wherein the optical switch has a second state in which, for a length of time corresponding to the remainder of the clock period, light that corresponded to the current bit becomes light corresponding to a previous bit and is dumped and in which light that corresponded to the next bit becomes light that corresponds to the current bit and is allowed to propagate along the pathway for a next clock cycle during which a fraction of the light corresponding to the current bit is out-coupled from the retimer each time the light propagates around the optical pathway;

an optical out-coupler that causes a fraction of the light corresponding to the current bit to be out-coupled from the retimer each time the light propagates around the optical pathway; and

an amplifier, the amplifier amplifying the light corresponding to the current bit to compensate for the light out-coupled from the retimer, the amplifier amplifying the light each time the light propagates around the optical pathway.

3. (Original) The optical retimer of claim 2, wherein the optical retimer further comprises a pulse generator for generating a pulse that causes the optical switch to switch from the first state to the second state for the duration of the pulse.

4. (Previously presented) The optical retimer of claim 3, wherein the optical switch is a Lithium Niobate switch, and wherein the pulse is an electrical pulse.

5. (Original) The optical retimer of claim 2, wherein the optical retimer is in communication with a pulse generator for generating a pulse that causes the optical switch to switch from the first state to the second state for the duration of the pulse.

6. (Previously presented) The optical retimer of claim 5, wherein the optical retimer is comprised of bulk optical elements and a Kerr medium, and wherein the pulse is an optical pulse generated by a laser focused on the Kerr medium.

7. (Previously presented) The optical retimer of claim 2, wherein the amplifier is a semiconductor optical amplifier (SOA).

8. (Previously presented) The optical retimer of claim 2, wherein the amplifier is an Erbium-doped fiber amplifier.

9. (Previously presented) The optical retimer of claim 5, wherein the optical switch is an electro-optic 2-by-2 optical crossbar switch, and wherein the pulse is an electrical pulse.

10. (Previously presented) The optical retimer of claim 2, wherein the optical pathway includes an optical fiber.

11. (Previously presented) The optical retimer of claim 10, wherein the optical switch is a Lithium Niobate switch; and wherein the optical pathway includes optical waveguides formed in the Lithium Niobate switch.

12. (Previously presented) The optical retimer of claim 2, wherein the optical switch is a Lithium Niobate switch, and wherein the Lithium Niobate switch, the optical out-coupler and the optical amplifier are embedded in a Lithium Niobate substrate.

13. (Previously presented) A method for retiming an optical data signal transmitted over a network, the method comprising the steps of:

providing an optical retimer;

providing an optical switch;

operating the optical switch to sample the optical data signal at a specific time and for a specific time duration during a clock cycle to obtain a current bit sample, the clock cycle corresponding to the rate at which the optical data signal is being transmitted;

propagating the light corresponding to the current bit sample along an optical pathway of the retimer for a time period substantially equal to the clock cycle;

out-coupling a fraction of the current bit sample of the optical signal from the retimer each time the light is circulated through the retimer;

amplifying the light corresponding to the current bit sample as it is propagated along the optical pathway to ensure that the propagating light is at a power level substantially equal to a power level of the sampled optical data signal, and wherein once the light corresponding to the current bit sample has propagated along the optical pathway for said time period, the out-coupled light represents a retimed version of the sampled optical data signal;

operating the optical switch to dump the light corresponding to said current bit sample at the end of said time period; and

sampling the optical data signal at a specific time and for a specific time duration during a next clock cycle to obtain a next bit sample and repeating the propagating, out-coupling and sampling steps for the next bit sample.

14. (Previously presented) The method of claim 13, wherein operating the optical switch to sample the optical data signal comprises a first state in which, for a length of time corresponding to some fraction of a clock period, light corresponding to the current bit is allowed to propagate along the optical pathway and light corresponding to a next bit is dumped, and wherein operating the optical switch to dump the light comprises a second state in which, for a length of time corresponding to the remainder of the clock period, light that corresponded to the current bit becomes light corresponding to a previous bit and is dumped and in which light that corresponded

to the next bit becomes light that corresponds to the current bit and is allowed to propagate along the pathway for a next clock cycle during which a fraction of the light corresponding to the current bit is out-coupled from the retimer each time the light propagates around the optical pathway.

15. (Previously presented) The method of claim 14, wherein the optical retimer comprises a pulse generator for generating a pulse that causes the optical switch to switch from the first state to the second state for the duration of the pulse.

16. (Previously presented) The method of claim 15, wherein the optical switch is an electro-optic 2-by-2 optical crossbar switch, and wherein the pulse is an electrical pulse.

17. (Previously presented) The method of claim 16, wherein the optical pathway includes optical waveguides formed in the optical switch that comprises a Lithium Niobate switch.

18. (Original) The method of claim 13, wherein the optical pathway includes an optical fiber

19. (Previously presented) The method of claim 15, wherein the optical switch is a Lithium Niobate switch, and wherein the pulse is an electrical pulse.

20. (Original) The method of claim 14, wherein the optical retimer is in communication with a pulse generator for generating a pulse that causes the optical switch to switch from the first state to the second state for the duration of the pulse.

21. (Previously presented) The method of claim 20, wherein the optical retimer is comprised of bulk optical elements and a Kerr medium, and wherein the pulse is an optical pulse generated by a laser focused on the Kerr medium.

22. (Original) The method of claim 13, wherein the step of amplifying is performed by a semiconductor optical amplifier (SOA).

23. (Original) The method of claim 13, wherein the step of amplifying is accomplished by an Erbium-doped fiber amplifier.

24. (Previously presented) The method of claim 14, wherein the optical retimer comprises a Lithium Niobate switch, an optical tap for performing the out-coupling step and an optical amplifier for performing the amplifying step, and wherein the Lithium Niobate switch, the optical out-coupler and the optical amplifier are embedded in a Lithium Niobate substrate.

25 - 29. (Canceled)